May 16th

INTERNATIONAL DAY OF LIGHT

Light & Innovation

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EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

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INTERNATIONAL DAY OF LIGHT

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16 May

Highlights:

- Light and light-based technologies are part of everyday life and are central to the future development of global society.
- The close connection between light and art and culture, enhancing the role of optical technology to preserve cultural heritage.
- The need for investment in light-based technologies to develop new applications, and the global necessity to promote careers in science and engineering to these fields.
- The importance of lighting technology and the need for access to light and energy infrastructure in sustainable development, and for improving quality of life in the developing world.
- Technologies and design can play an important role in the achievement of improved energy efficiency, and in the reduction of light pollution, which is key to the preservation of dark skies.

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{PHOTOANTIMICROBIALS}

OVERVIEW

{Photoantimicrobials} harnesses the power of light to combat microbial infections. When a photosensitizer absorbs light in the presence of oxygen, it generates reactive oxygen species that eliminate pathogens—offering a promising solution in the fight against antomicrobial resistance.

Standardization

Establishing protocols and benchmarks for {photoantimicrobials} research and clinical applications worldwide.

Devices

Developing advanced light sources and delivery systems for effective photodynamic treatment.

Education & Terminology

Training researchers and clinicians while unifying scientific terminology across disciplines.

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CORE DISCIPLINES

The three fundamental scientific disciplines that form the foundation of photodynamic research and light-based therapies, working together to advance our understanding of light interactions.

Photophysics

Study of physical processes induced by light absorption, energy transfer, and emission phenomena.

Photochemistry

Chemical reactions and transformations triggered by light energy and photon interactions.

Photobiology

Effects of light on living organisms, from cellular responses to therapeutic applications.

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{PHOTOANTIMICROBIALS} MECHANISM

The photodynamic inhibition process follows a precise sequence: **Photosensitizer** molecules absorb light energy at specific wavelengths, triggering the energy transfer cascade.

This elegant mechanism enables targeted antimicrobial action through **light-activated** chemistry.

PS → Light Activation

Light energy excites the photosensitizer (PS), which then transfers energy to molecular oxygen (O_2), generating reactive oxygen species.

O_2 → ROS Generation

ROS production creates oxidative stress that damages microorganisms cell membranes, proteins, and DNA, leading to pathogen elimination.

ROS → Microorganism Elimination

The final step achieves microorganisms cell death through multiple oxidative damage pathways, ensuring effective antimicrobial action.

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APLICATION OF {PHOTOANTIMICROBIALS}

MEDICINE

- Infection control
- Wound healing
- Resistance reduction

DENTISTRY

- Control of oral pathogens
- Periodontal therapy
- Root canal desinfection
- Plaque treatment

AGRICULTURE

- Control of plant pathogenes
- Reduction of pesticide use
- Sustainable crop production

FOOD SECURITY

- Decontamination of food products
- Reduction of post-harvest losses
- Food safety

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Join The Movement!

Let's Unify, Align & Educate!

Together we can harness light for health, food, and a sustainable future!

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